What is claimed is:

1. A method for modeling visual images and wave propagation, comprising the steps of:

(a) describing a scene mathematically;

(b) processing source and receiver information;

(c) calculating visibility areas;

(d) tracing wavefronts; and

(e) displaying results.

2. The method of claim 1 wherein step (a) further comprises:

inputting boundary information for each object in a scene;

transforming the boundary information to express boundaries as boundary elements in a desired mathematical representation;

determining all boundary elements that are visible from any point on a particular boundary element, for each boundary element;

identifying media on opposite sides of a particular boundary element, for each boundary element;

verifying consistency of the identified media; and

inputting physical parameters of the media.

3. The method of claim 2 further comprising the steps of:

producing reference tables; and

storing in computer memory the reference tables.

4. The method of claim 1 wherein step (b) further comprises:

inputting a source position for all sources;

inputting a receiver position for all receivers;

determining all boundary elements that are visible from a particular source, for each source;

determining all boundary elements that are visible from a particular receiver, for each receiver;

storing in computer memory the determined boundary elements that are visible from a particular source, for each source; and

storing in computer memory the determined boundary elements that are visible from a particular receiver, for each receiver.

5. The method of claim 4 further comprising the step of verifying media consistency of the identified boundary elements.

6. The method of claim 1 wherein step (c) further comprises:

determining visibility limits of all boundary elements that are visible from any point on a particular boundary element, for each boundary element;

determining visibility limits of all boundary elements that are visible from a particular source, for each source;

determining visibility limits of all boundary elements that are visible from a particular receiver, for each receiver;

eliminating from further processing those portions of all boundary elements whose visibility is screened by other boundary elements, relative to any point on a particular boundary element, for each boundary element;

eliminating from further processing those portions of all boundary elements whose visibility is screened by other boundary elements, relative to a particular source, for each source;

eliminating from further processing those portions of all boundary elements whose visibility is screened by other boundary elements, relative to a particular receiver, for each receiver;

determining visibility borders;

subdividing each visibility range into visibility subranges such that the visibility borders of each visibility subrange can be represented by a continuous, monotonic function with only one type of curvature; and

storing in computer memory the visibility subranges.

7. The method of claim 6 further comprising the step of identifying unique visibility borders among all remaining portions of all boundary elements.

8. The method of claim 6 further comprising the step of compressing the visibility limit data stored in computer memory to save memory space.

9. The method of claim 6 further comprising the step of building cross-reference tables.

10. The method of claim 1 wherein step (d) further comprises for each source:

(i) determining if there are any direct paths between a particular source and the receivers;

(ii) subdividing an initial wavefront emanating from the particular source into front elements such that a particular front element impinges on a particular boundary element that is visible from the particular source;

(iii) determining a projection of the particular front element onto the particular boundary element, for each front element;

(iv) determining reflected front elements, for each front element;

(v) determining refracted front elements, for each front element;

(vi) determining whether any of the reflected or refracted front elements impinge on any of the receivers;

(vii) determining a particular ray path between a particular receiver and the particular source, for each front element that impinges on any of the receivers;

(viii) computing physical parameters based on the particular ray path, for each particular ray path;

(ix) storing in computer memory the computed physical parameters;

(x) determining all boundary elements on which the reflected and refracted front elements emanating from the particular boundary element will impinge, for each front element;

(xi) subdividing the reflected and refracted front elements that impinge on more than one boundary element into subdivided front elements such that each subdivided front element

impinges on a single boundary element; and

(xii) repeating steps (iii)-(xii) using a particular subdivided front element and its associated boundary element instead of the particular front element and the particular boundary element, for each subdivided front element, until all subdivided front elements are either eliminated or no longer impinge on any boundary.

11. The method of claim 10 further comprising the steps of:

determining whether the reflected front elements or the refracted front elements have less energy than a comparison value, for each reflected front element and each refracted front element; and

eliminating from further processing each reflected front element and each refracted front element having less energy than the comparison value.

12 The method of claim 10 further comprising the step of eliminating from further processing each reflected front element that has undergone a user-defined number of reflections.

13. The method of claim 10 further comprising the steps of:

determining a particular reverse ray path from the particular receiver to the particular source to verify that the particular reverse ray path terminates within a tolerance value at the particular source, for each of the particular ray paths; and

computing a modified particular reverse ray path for each particular reverse ray path that does not fall within the tolerance value at the particular source until the modified particular reverse ray path terminates within the tolerance value at the particular source.

14. A method for modeling visual images and wave propagation, comprising the steps of:

(a) describing a scene mathematically;

(b) processing source and receiver information;

(c) calculating visibility areas;

(d) interpolating front elements analytically;

(e) tracing wavefronts; and

(f) displaying results.

15. The method of claim 14 further comprising the step of determining intensity of a reflection.

16. The method of claim 15 further comprising the step of determining shading.

17. The method of claim 15 further comprising the step of determining shadowing.

18. The method of claim 15 further comprising the step of determining color.